



**- PRELIMINARY DRAFT FOR DISCUSSION -**

**REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) SCOPE**  
**OPERABLE UNIT 2 (OU2) - SOUTH DAYTON DUMP AND LANDFILL**

OU2 includes the following areas not contained in OU1:

- Landfill material, surface and subsurface soil, and hot spots outside the OU1 Area [e.g., the floodplain area between the Site and the Great Miami River (GMR)]
- Deeper groundwater [i.e., nominally at elevations below 675 feet above mean sea level (ft AMSL), within the Till-Rich and Lower Aquifer Zones] within and outside the OU1 Area
- Shallow groundwater outside the OU1 Area
- Leachate outside the OU1 Area (e.g., the floodplain area between the Site and the GMR)
- Landfill gas (LFG) and soil vapor outside the OU1 Area
- Surface water and sediment outside the OU1 Area (e.g., the floodplain area between the Site and the GMR)
- Air outside the OU1 Area

The Conceptual Site Model contaminant transport mechanisms flow chart is presented on Figure 1. The Conceptual Site Model is presented on Figure 2.

OU2 Data Gaps are presented on Figure 3. Considering the RI data for OU1, the following data gaps exist with respect to OU2:

**Landfill Material, Surface and Subsurface Soil, and Hot Spots outside the OU1 Area**

*Landfill Material and Soil outside OU1*

Given the nature of historic activities and what is currently known regarding the limits of the landfill, significant quantities of waste are unlikely to have been disposed of off Site. In addition to revenue from tipping fees, the primary intent of the Site owners appears to have been to fill the Site to grade to permit additional development. Disposing of waste on other properties would have been counter to this goal. Some wastes may extend beyond the Site boundaries where filling encroached on neighboring properties. Evidence of filling beyond the Site boundaries has been encountered on Miami Conservancy District (MCD) Parcels 3056, 3057, 3058, 3275, and 3278. CRA proposes to excavate additional test pits immediately adjacent to the Site boundaries to identify any areas where landfilling activities have encroached onto neighboring properties. The proposed soil sampling locations are presented on Figure 4.

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Regarding soil contamination outside of OU1, the most likely mechanisms for Site contaminants to migrate off Site and impact off-Site soils are erosion from the embankments onto the floodplain of the GMR.

Identification of Site-related contaminants in soil samples will be confounded by historic filling activities on other Sites – fill, including residual waste and construction and demolition debris, has been identified on the DP&L property and along the Miami Conservancy District (MCD) bike path. Interpretation of soil quality data will also be rendered difficult by the influence of the operations of the former coal-fired power plant on the adjacent DP&L property, the on-Site Valley Asphalt plant, and industrial land use in the vicinity of the Site on concentrations of contaminants in soils in the area of the Site.

### *Background Metals and Polycyclic Aromatic Hydrocarbon (PAH) Concentrations*

There are widespread metals impacts in surface and subsurface soil, respectively, across the Site, including arsenic, antimony, chromium, cobalt, copper, iron, lead, and manganese. The metals impact is likely associated with the disposed waste, including foundry sands, slag, fly and bottom ash, and ash from the on-Site combustion of waste material. Metals concentrations may also be due, in part, to background metals concentrations in native soils.

PAH concentrations are also elevated across the Site. The sources of PAH impact likely include the following:

- Operation of a hot-mix asphalt plant on Site since approximately 1956 and the storage of large quantities of crushed asphalt on-Site for recycling.
- Disposal of waste materials, including asphalt shingles and fly and bottom ash, and ash from the on-Site combustion of waste material.
- The historic and current presence of automobile salvage yards in the north-central (northern part of Parcel 5177/southern part of Parcels 5054 and 5171) and southeastern (Parcels 3753 and 4423) portions of the Site, respectively. Oil and hydraulic fluids leaking from vehicles would potentially contribute PAH contamination.
- The presence of a coal-fired power plant on the adjacent Dayton Power & Light (DP&L) property to the east of the Site.
- Historical industrial activities and coal burning in the vicinity of the Site, which may have resulted in elevated background concentrations of PAHs.

CRA has not completed a Site-specific assessment of the background metals and PAH concentrations. The lack of Site-specific background data for metals and PAHs represents a

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potential data gap, which will potentially confound the interpretation of any off-Site metals and PAH data.

### **Leachate outside the OU1 Area**

This issue is largely addressed through previous leachate efforts. Continued monitoring for leachate during routine synoptic water level rounds should address this issue.

If leachate seeps are identified, CRA will collect samples in accordance with the methodologies outlined in the Leachate Seep Investigation Letter Work Plan.

### **Surface Water and Sediment outside the OU1 Area**

#### *Surface Water and Sediment Impacts*

Ohio EPA collected three sediment samples in 1996 from the GMR at locations adjacent to the northern, central, and southern portions of the Site. The samples contained TCE, SVOCs, PAHs, mercury, arsenic, and other inorganic chemicals. The concentrations of PAHs and arsenic were greater than their respective RSLs.

Additional investigation is required to determine upstream sediment concentrations and concentrations adjacent to and downgradient of the Site. Concomitant surface water sampling is required to identify related impacts to surface water as well as impacts to surface water from the discharge of Upper Aquifer groundwater migrating from the Site. The proposed sediment and surface water locations are presented on Figures 5 and 6, respectively.

#### *GMR Ecology*

An assessment of the ecology of the GMR adjacent to the Site will be required to identify ecological receptors and determine whether threatened, endangered, or otherwise sensitive species are present.

### **Deeper Groundwater and Shallow Groundwater outside the OU1 Area**

#### *Chlorinated Solvents - VAS-09, VAS-08, and VAS-15*

CRA collected a groundwater sample from VAS-09 (700 - 705 ft AMSL) that contained trichloroethylene (TCE) (5,100 µg/L), cis-1,2-dichloroethylene (cis-1,2-DCE) (3,900 µg/L), and vinyl chloride (VC) (760 µg/L). Based on the groundwater quality data for the VAS samples collected from VAS-09, CRA installed MW-215A 6.4 feet to the northeast of VAS-09 with a well screen set between 19 and 29 feet below ground surface (ft bgs) (703 to 713 ft AMSL). TCE, cis-1,2-DCE, and VC were non-detect or detected at concentrations less than their respective

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United States Environmental Protection Agency (USEPA) Regional Screening Levels for Contaminants at Superfund Sites (RSL) Maximum Contaminant Levels (MCLs) in groundwater samples collected from MW-215A. USEPA suspects the MW-215A screened interval depth, which was 4 ft above the till layer, and the longer screen interval may have contributed to the discrepancy in chlorinated solvent concentrations. However, given that the sample locations (i.e., the depth at which the pump intake is set) for VAS-09 and MW-215A only differ in elevation by 5.5 feet, it is unlikely that a difference in concentration of several orders of magnitude would occur over such a short depth interval. The top of the till layer was 1 ft lower in MW-215A than the till layer observed in VAS-09. The discrepancy between chlorinated solvent concentrations in VAS-09 and monitoring well MW-215A represents a data gap for as it is unclear if there is a localized source of contamination, a preferential flow path near VAS-09, or the VAS data are anomalous. Further, the source of the shallow groundwater contamination that was detected in the groundwater samples collected from VAS-09 has not been determined.

CRA set the MW-215B well screen above a third till layer, which was not encountered during the drilling of VAS-09, located 7.5 ft away. It is not clear whether MW-215B is in the flow path of the TCE contamination that was detected below the second till layer in VAS-09, or what the TCE concentrations would be immediately below the second till layer. This represents a data gap.

CRA collected groundwater samples from the Upper Aquifer Zone during the drilling of VAS-08 (680 - 700 ft AMSL) that contained concentrations of TCE (7.4 - 51 µg/L) that were greater than its MCL RSL of 5 µg/L. The source of the TCE in this sample from VAS-08 may be the same as the source of TCE detected in the samples collected from nearby VAS-09; however, this has not been confirmed.

CRA collected groundwater samples from VAS-15 (631 - 641 ft AMSL) that contained concentrations of cis-1,2-DCE (130 - 150 µg/L), TCE (6.9 - 8.9 µg/L), and VC (27 - 28 µg/L), which were greater than MCL RSLs. The maximum concentrations of cis-1,2-DCE were detected in groundwater samples collected from VAS-15 (631 - 641 ft AMSL), which was at the bottom of the boring, indicating that the vertical extent of contamination at this location was not delineated, which represents a data gap.

The sources of TCE in the samples collected from VAS-08 and VAS-15 may be the same as the source of TCE in the samples collected from nearby VAS-09; however, this and the potential for off-Site migration in either of the Upper or Lower Aquifer Zones has not been confirmed. The OU2 RI/FS needs to assess both the potential for off-Site impact in the Upper Aquifer Zone and for contamination in the Lower Aquifer Zone.

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During Phase 1 of the OU2 Groundwater Investigation, CRA proposes to complete a membrane interface probe (MIP) investigation in the areas around VAS-09, MW-215, VAS-08, and VAS-15 to identify the source(s) of the contamination. CRA will then complete a VAS boring in the area of greatest VOC contamination (as determined using the MIP). CRA will also complete a VAS boring to 200 ft bgs at the location of MW-215<sup>1</sup> in order to determine the vertical extent of contamination. Permanent monitoring well(s) will be installed at both VAS locations and will be screened across the interval(s) of greatest impact as determined during the VAS investigation. The proposed MIP and VAS locations in the areas around VAS-09 are presented on Figure 7.

During Phase 2 of the OU2 Groundwater Investigation, CRA will also complete VAS boring(s) at the property boundary downgradient of the location of the core of the contamination in order to determine whether contaminants are migrating off Site. Additional investigation will be completed as necessary in order to delineate any off-Site impacts arising from the chlorinated solvents present in groundwater samples from VAS-09, MW-215, VAS-08, and VAS-15.

*Chlorinated Solvents - VAS-21 and MW-210*

Contamination in VAS-21 groundwater samples and in samples collected from monitoring wells MW-210, MW-210A, and MW-210B is well defined vertically; although, the OU1 RI did not fully delineate the vertical extent of VC contamination. However, the source and extent of contamination present in the shallow groundwater in samples collected from MW-210 are not well understood. TCE contamination appears to be restricted to the shallower groundwater above the Till-Rich Zone, the top of which is encountered at depths of 700 to 695 ft AMSL, and which varies in thickness between 14.5 and 17.5 ft in the MW-210 well nest. The benzene, methylene chloride, and VC contamination appear to be restricted to the deeper groundwater below the uppermost till layer.

CRA collected a groundwater sample from VAS-21 (580 - 585 ft AMSL) that contained a concentration of VC of 60 µg/L, which was greater than the RSL MCL of 2.0 µg/L. This interval was not captured by the well screen intervals of either MW-210A or MW-210B. The lack of a monitoring well screened at the 580 - 585 ft AMSL interval at VAS-21/MW-210 represents a data gap.

The Respondents proposed to complete additional investigation to delineate shallow groundwater contamination in the area of VAS-21/MW-210 in the MW-210 Shallow Groundwater Investigation Letter Work Plan, dated March 16, 2010. Phase 1 of the MW-210 investigation will include MIP screening and installation of permanent monitoring wells in the

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<sup>1</sup> The location of the VAS boring at VAS-15 may be adjusted based on the results of the MIP investigation in order to target contaminant migration pathways.

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Upper Aquifer Zone at the property boundary where contaminants are determined to be migrating off Site based on the MIP investigation. The proposed MIP and VAS locations in the areas around VAS-21/MW-210 are presented on Figure 9. Phase 2 of the MW-210 Investigation would include an off-Site MIP investigation, VAS borings, and monitoring wells, as appropriate, to delineate off-Site impacts arising from the off-Site migration of chlorinated solvents in the Upper Aquifer near MW-210. Phase 2 will include an assessment of the potential impacts to downgradient residents and will include installation of soil vapor probes if warranted based on the concentrations of contaminants in groundwater.

Additional investigation is required to delineate deeper groundwater contamination<sup>2</sup>. In Phase 1 of the OU2 Groundwater Investigation, CRA will install a permanent monitoring well with a screen interval between 580 and 585 ft AMSL, which corresponds with the depth of the VAS sample from VAS-21B containing the highest concentration of VC. In addition, CRA will complete a VAS boring to 300 ft bgs, or the top of bedrock, whichever occurs first, in order to vertically delineate the VC impact indicated by the data for groundwater samples collected from VAS-21B.

#### *TCE - VAS-30*

CRA collected a groundwater sample from VAS-30 (76 - 86 ft bgs<sup>3</sup>) that contained a concentration of TCE of 6.9 µg/L, which was greater than the RSL MCL of 5.0 µg/L. This interval was not captured by the well screen intervals of either MW-224A (35 - 40 ft bgs) or MW-224B (100 - 105 ft bgs). The well screen interval of MW-224B was set at the same approximate elevation as MW-223B (98.5 - 103.5 ft bgs), in order to track concentrations of cis-1,2-DCE (350 µg/L) and VC (140 µg/L) detected in groundwater samples collected from down-gradient VAS location VAS-29 (96 - 106 ft bgs). The lack of a monitoring well screened at the 76 to 86 ft bgs interval at OU2 location VAS-30/MW-224 represents a data gap.

In Phase 1 of the OU2 Groundwater Investigation, CRA will install a monitoring well near VAS-30 with a screen interval between 78.5 and 83.5 ft bgs. The screen interval will permit the collection of groundwater samples from the same depth (i.e., 81 ft bgs) as the VAS sample from VAS-30, which contained the greatest concentration of TCE detected in groundwater samples collected from VAS-30 during the OU1 RI.

#### *TCE - MW-229*

In April 2010, CRA collected a groundwater sample from MW-229, which is screened at the water table surface. The groundwater sample contained TCE (70 µg/L). The source of the TCE

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<sup>2</sup> The deeper groundwater contamination may be due to off-Site sources, i.e., benzene from DP&L and chlorinated solvents from either Delphi or DP&L.

<sup>3</sup> The sample pump intake was set at a depth of 81 ft bgs, i.e., the midpoint of the temporary well screen.

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is unknown; however, MW-229 may be, at least during parts of the year, downgradient of the Valley Asphalt Drum Removal excavation, which is located to the south.

In Phase 1 of the OU2 Groundwater Investigation, CRA will complete an MIP investigation of the area surrounding MW-229 in an attempt to identify the source of the TCE contamination. CRA will install permanent Upper Aquifer Zone monitoring wells at the location of the greatest contamination (as determined by the MIP Investigation) and in the downgradient direction. The proposed MIP locations in the area around MW-229 are presented on Figure 7. CRA will complete additional investigation in Phase 2 as required to delineate any Upper Aquifer Zone groundwater contamination that may be migrating off Site.

### *Chlorinated Solvents in the Lower Aquifer Zone Groundwater*

A large chlorinated solvent plume exists between the eastern portion of the Site and the DP&L property. cis-1,2-DCE and VC have been detected in the groundwater samples collected from the Lower Aquifer Zone centered beneath the DP&L property. CRA has not determined the upgradient source(s) of this contamination. Additional investigation beneath the Site and beneath the DP&L property is required to confirm whether the source of the deeper groundwater contamination is on-Site, off-Site, or both.

CRA suspects that the source of the contamination may be, at least in part, the former Delphi facility to the northeast of the Site. Ohio EPA has requested that the current owners of the Delphi site (Industrial Remediation Group LLC) investigate the potential off-Site impacts associated with the Delphi site. Therefore, it will not be necessary to trace any VC and cis-1,2-DCE contamination all the way back to the Delphi site, if indeed that is the source of the contamination, if this work is done as Ohio EPA requests. Rather, sufficient data are required to definitively state whether the Site is or is not a source of the chlorinated solvent impacts in the Lower Aquifer Zone groundwater.

During Phase 1 of the OU2 Groundwater Investigation, CRA proposes to install one 200-ft deep VAS boring on Site between VAS-14 and VAS-07 and one 200-ft deep VAS boring on DP&L property to the east of VAS-30. These two VAS borings should help determine whether the deeper cis-1,2-DCE plume is centered beneath the Site or beneath the DP&L property and whether there is a source upgradient of the DP&L Site. The proposed VAS locations are presented on Figure 10.

### *LNAPL in MW-219*

CRA screened MW-219 from 22 - 32 ft bgs, to characterize the light non-aqueous phase liquids (LNAPL) observed in VAS-04. USEPA had indicated that a VAS borehole should be advanced down to at least 100 ft bgs to characterize the LNAPL and underlying groundwater. CRA had

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screened MW-219 at the water table, in order to prevent draw-down of LNAPL to deeper depths where there may not be LNAPL.

The extent of the residual LNAPL has been delineated and no groundwater contaminants are present at concentrations greater than RSL MCLs in groundwater samples collected from MW-219, in the center of the LNAPL plume. However, the potential for contamination of the deeper groundwater at this location has not been assessed. CRA proposes to install a VAS boring to 100 ft bgs at this location. The VAS boring will be advanced to 200 ft bgs if contamination is not adequately delineated within the first 100 ft. The proposed VAS location by MW-219 is presented on Figures 7 and 10.

### *Off-Site Groundwater to the South of the Site*

Investigation of shallow groundwater south of the Site is required to confirm that on-Site shallow groundwater contamination is not migrating off-Site. Investigation of Lower Aquifer groundwater south of the Site may be required dependant on the results of investigation of data gaps detailed above. Investigation of supply wells may be required. Investigation of the nearest potable supply well is already proposed as part of the MW-210 Investigation.

In Phase 1 of the OU2 Groundwater Investigation, CRA proposes to complete a MIP investigation along the southern boundary of the Site to identify any areas where groundwater contamination may be leaving the Site. CRA will complete VAS borings and install permanent Upper Aquifer Zone monitoring wells at any location where elevated concentrations of contaminants are suspected based on the results of the MIP investigation<sup>4</sup>. The proposed MIP and VAS locations along the southern boundary of the Site are presented on Figure 8. CRA will complete additional off-Site and Lower Aquifer Zone investigation during Phase 2 of the OU2 Groundwater Investigation if warranted based on the results of Phase 1.

### *Shallow Vertical Aquifer Sampling (VAS) borings at Perimeter Locations*

CRA completed VAS at perimeter locations VAS-02, VAS-20, and VAS-22 and off-Site location VAS-24 to determine whether there were any further significant shallow source areas under the Site. As those VAS locations were not completed to 100 ft bgs, this may be a data gap. Should on-Site sources of deep groundwater contamination be identified through the investigations discussed above, select areas may be investigated further in Phase 2 of the OU2 Groundwater Investigation.

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<sup>4</sup> For the purposes of scoping Phase I of the OU2 RI, CRA has assumed that two VAS borings will be required.



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**Landfill Gas and Soil Vapor**

CRA identified the presence of LFG and VOCs in soil vapor samples collected from several of the soil gas probes. Although the concentrations of contaminants were less than generic risk-based criteria, there are no data from off-Site locations to monitor the off-Site migration of LFG and soil vapor. CRA has completed basic modeling during the completion of the FS to assess potential risk; however, empirical data should be collected to confirm the level of risk.

CRA proposes to install three soil vapor probes adjacent to the DP&L Service Center building to determine whether the TCE detected in the soil vapor samples collected from soil gas probe GP20-09 are migrating off Site. The DP&L Service Center building is the nearest off-Site building. The proposed soil gas probe locations are presented on Figure 11. Additional soil vapor investigation will be proposed if required based on the results of the OU2 Groundwater Investigation.

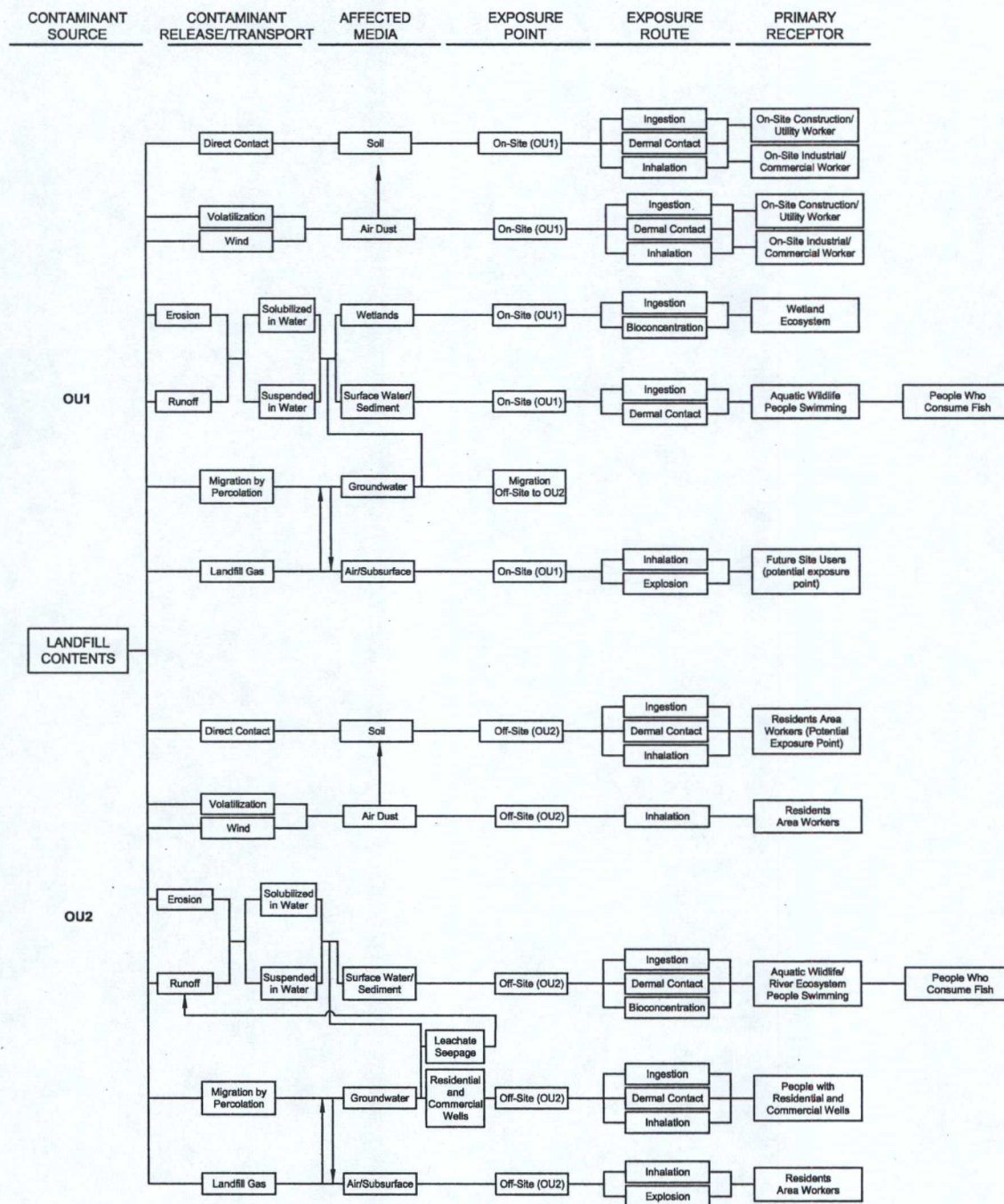
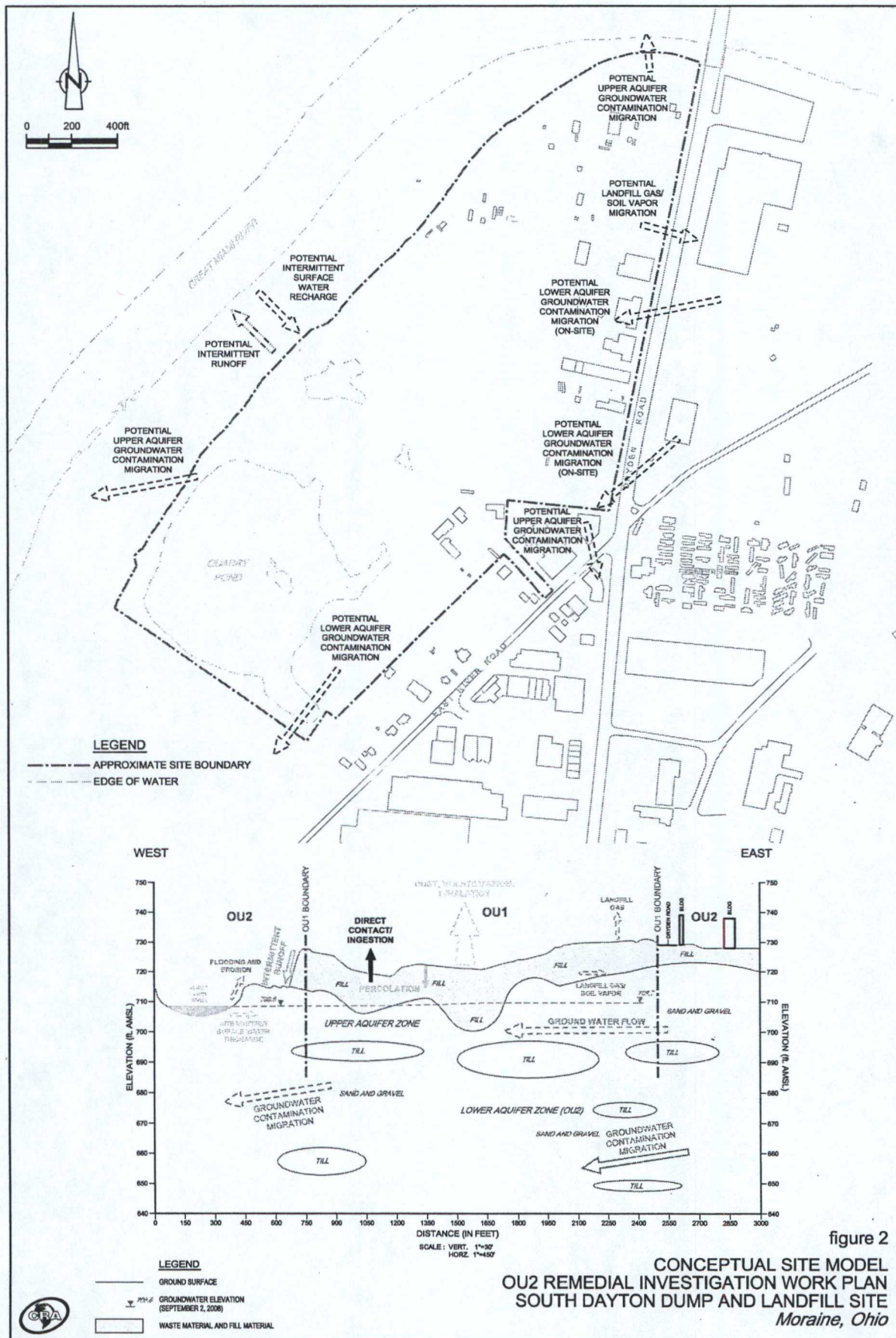


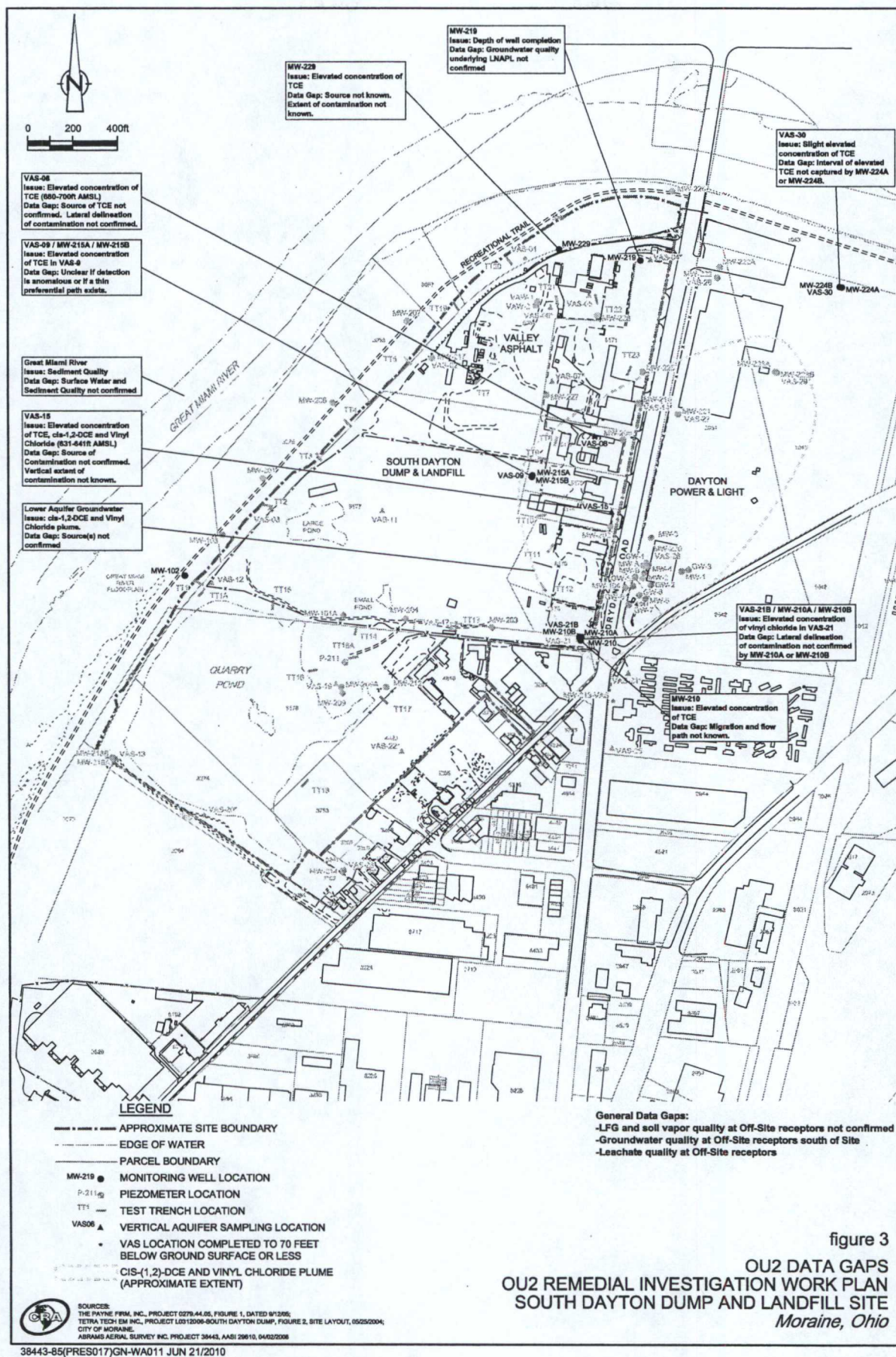
figure 1

CONCEPTUAL SITE MODEL  
SOUTH DAYTON DUMP AND LANDFILL SITE  
Moraine, Ohio

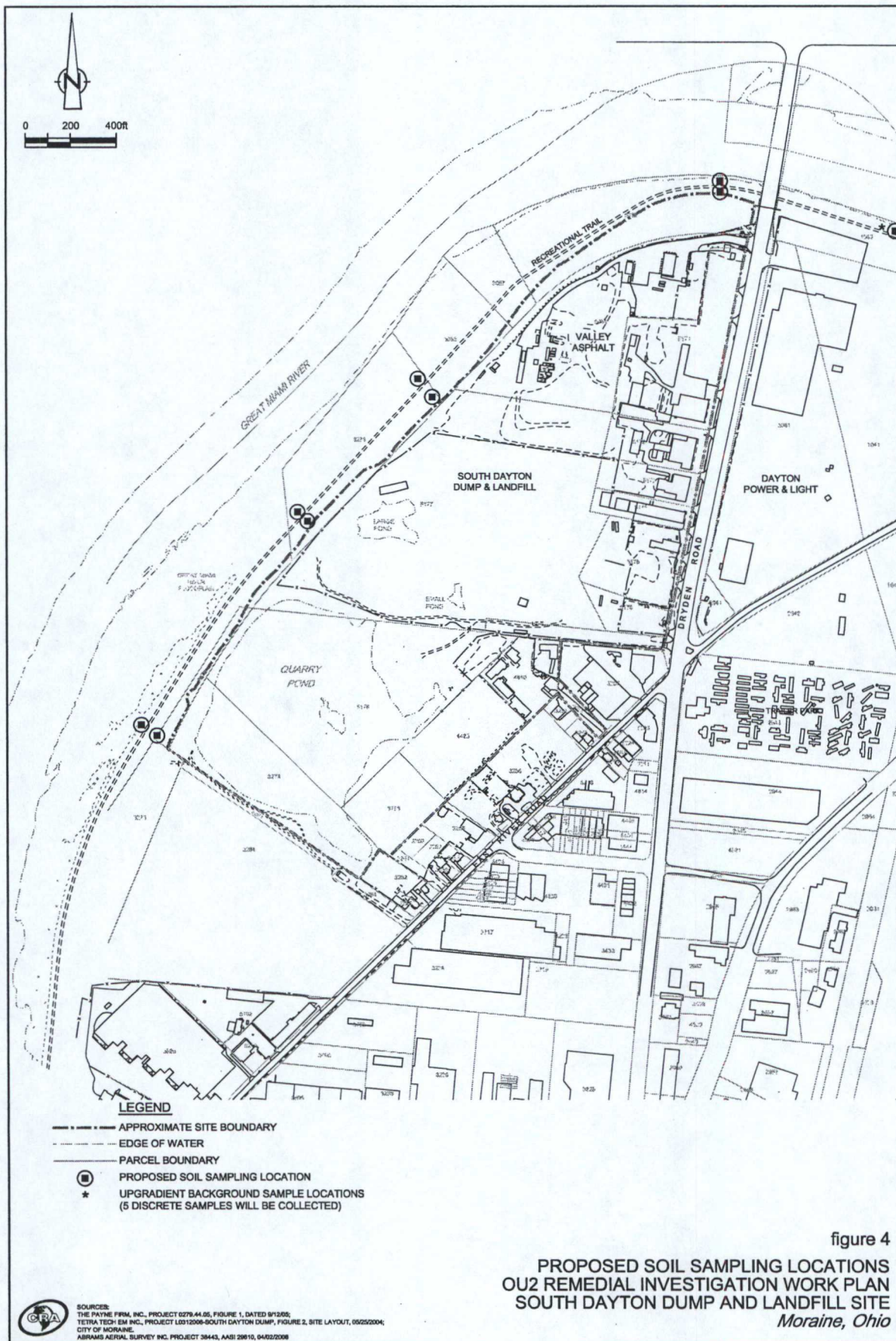




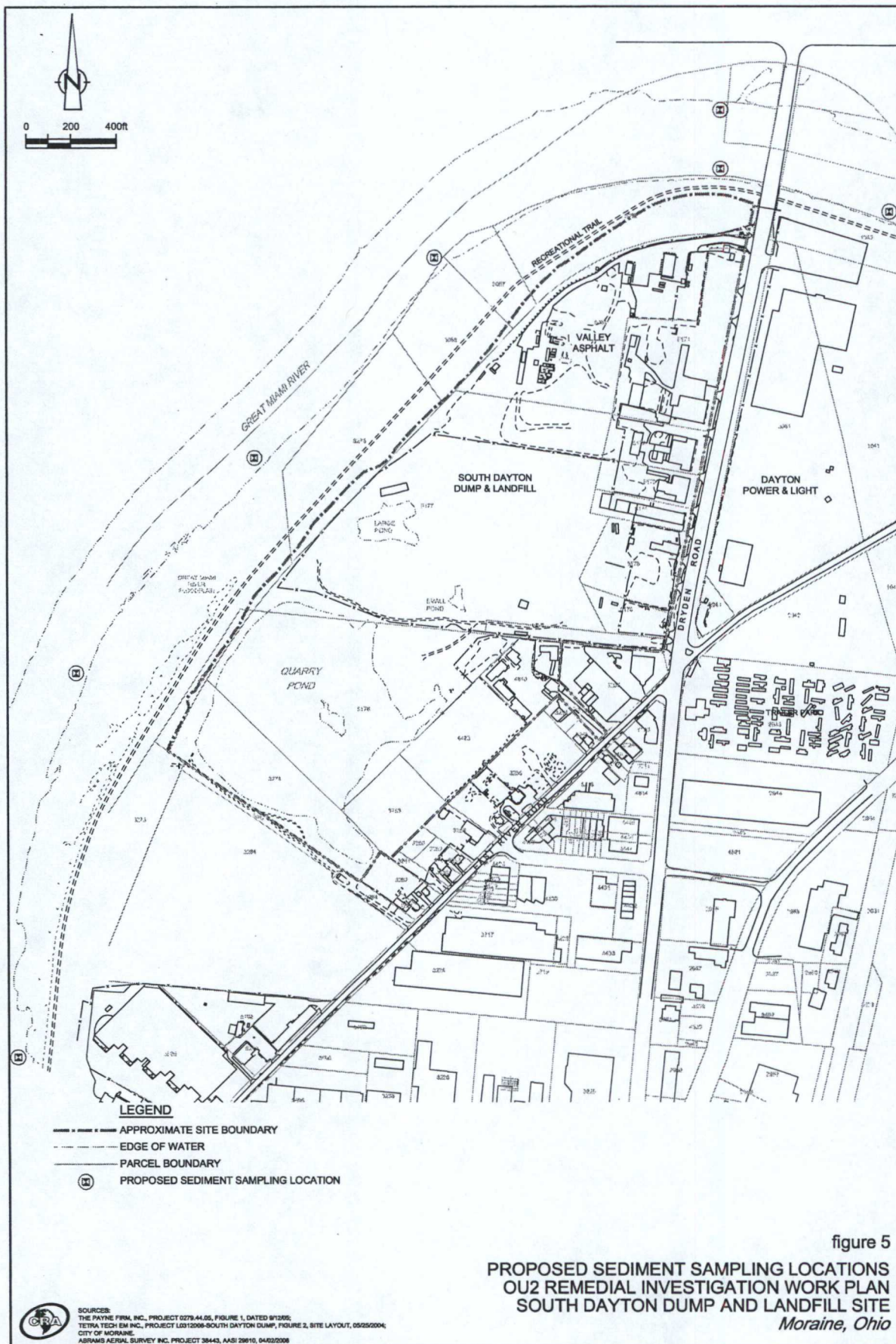




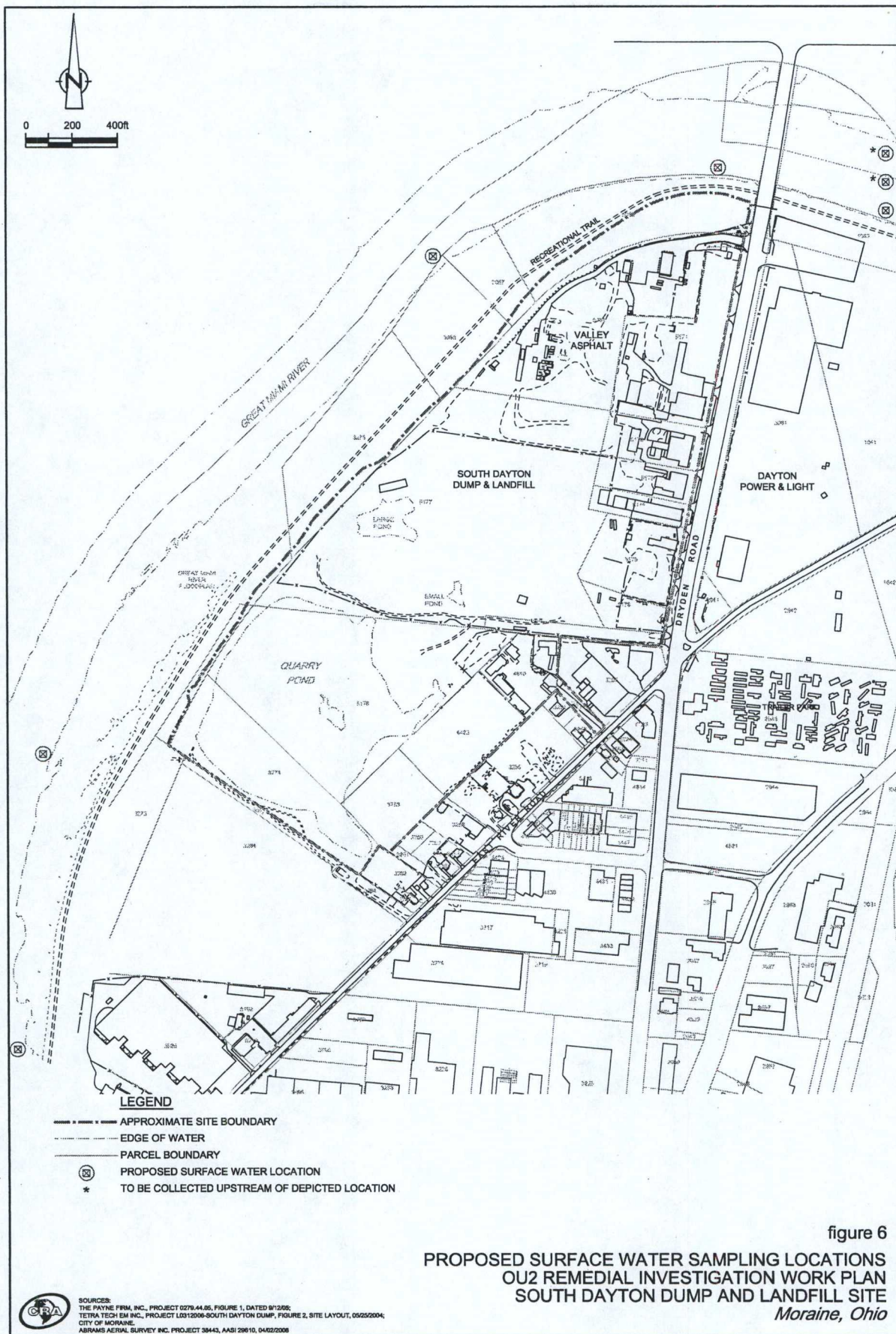




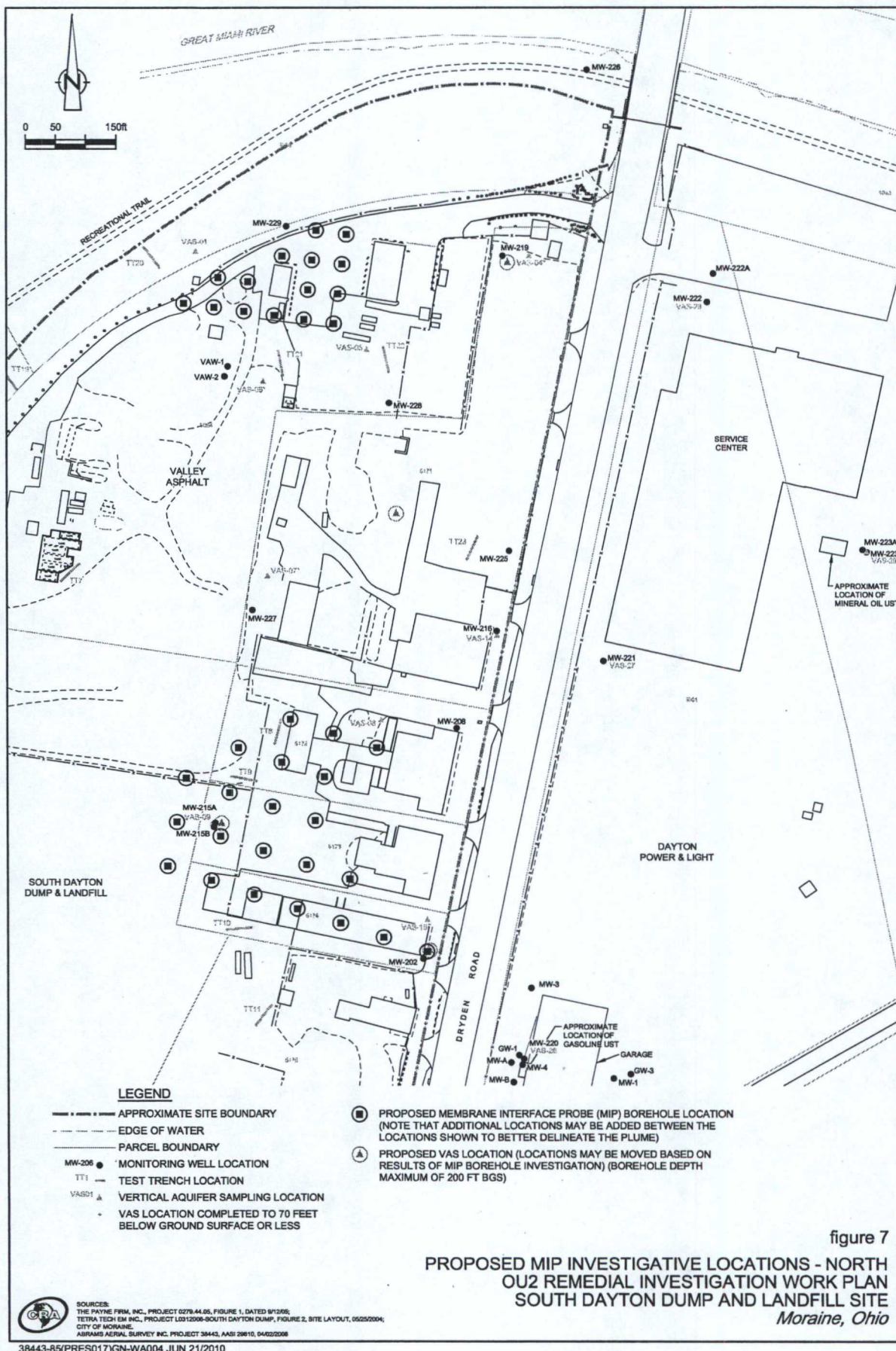




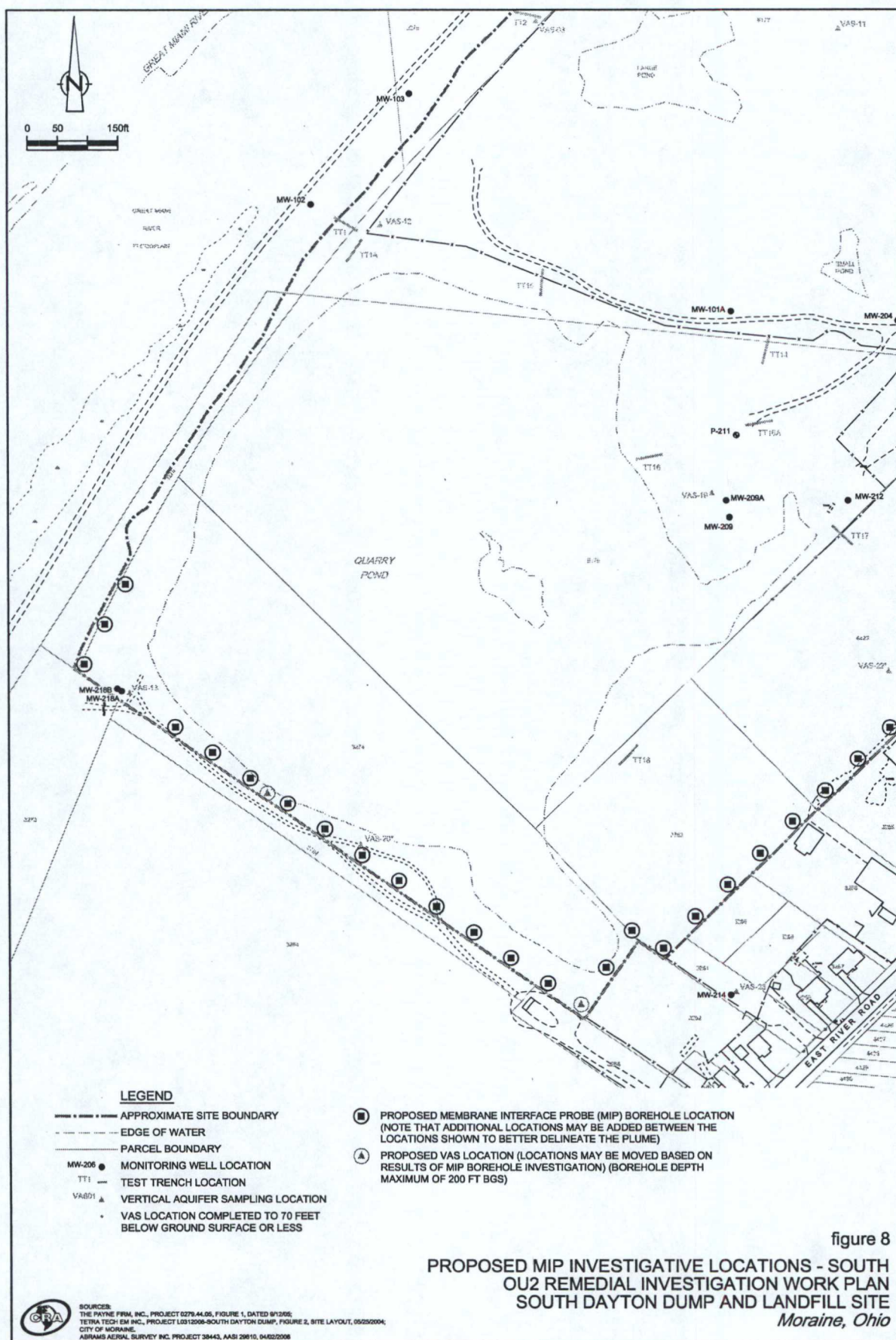












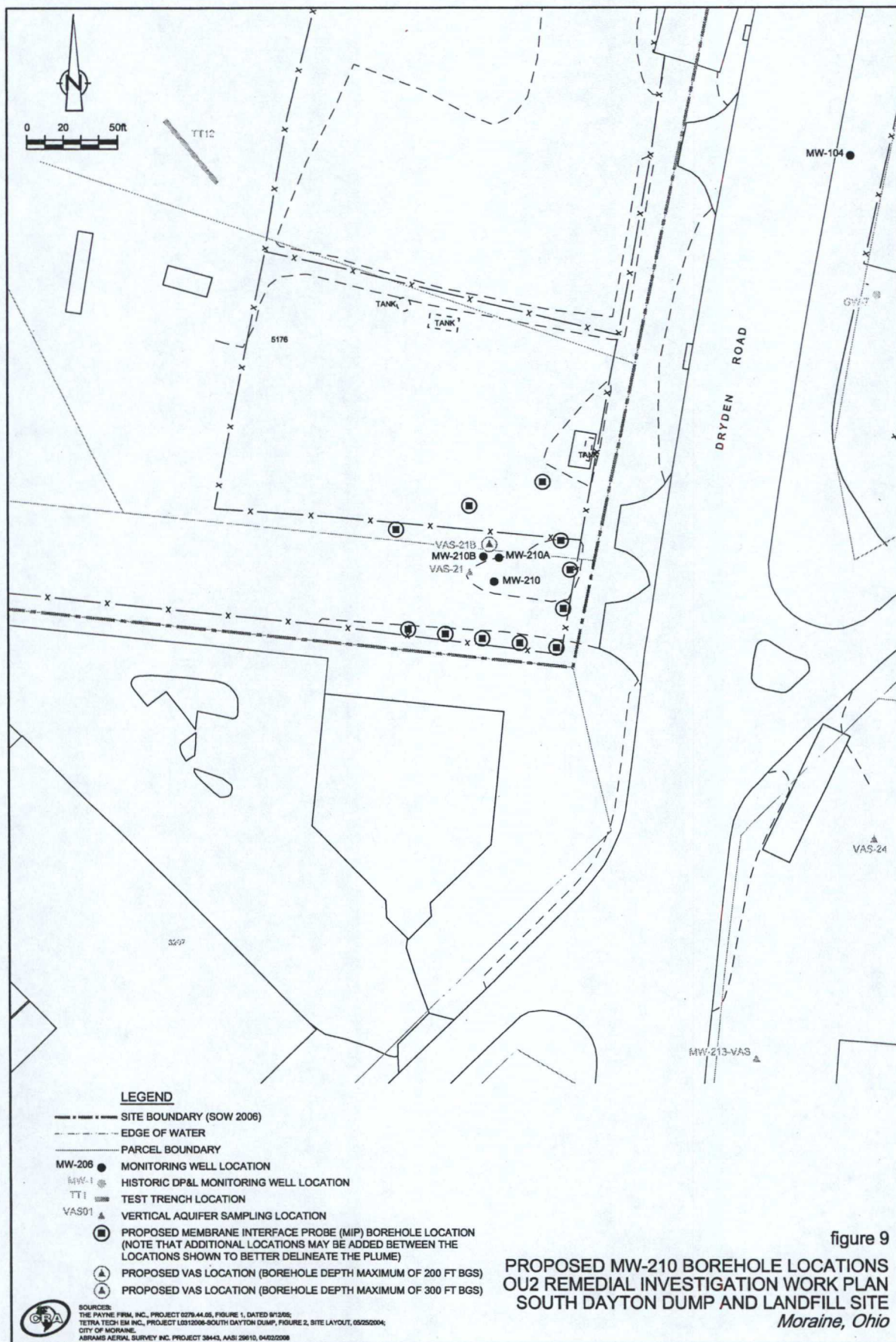


figure 9

**PROPOSED MW-210 BOREHOLE LOCATIONS  
 OU2 REMEDIAL INVESTIGATION WORK PLAN  
 SOUTH DAYTON DUMP AND LANDFILL SITE  
 Moraine, Ohio**



